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Title: Sealed Vessel Leak Test

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Sealed Vessel Leak Test

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Introduction

- A test plan has been developed to verify the results obtained from sealed vessels used in support of the JT5-Alt370-IN-1 compatibility testing.
- The test plan needs to be verified by doing a mock test on testing vessels, it will be adjusted and redone as necessary then conducted on the remaining vessels from the compatibility tests.

Project Overview

01

Objective

- Develop a test procedure to validate leak-proof integrity of vessels.

02

Background

Vessels

- Sealed Swagelok fittings.

Instrument

- Parr Instrument Company Pressure Vessel.

Ideal Gas Law

- Formulas and concepts used in experiment.

03

Experimental Methods

- Parameter definition.
- Experimental setup and procedure.

04

Expected Results

- Results for mock test and on samples.

Objective

- The intent of this experiment is to develop a test procedure to validate leak-proof integrity of previously sealed Swagelok assembled fittings.

Background

Vessels

- Swagelok assembled fittings with welded tubes at one end.
- Vessels will be sealed to manufacturer specifications.
- Gap test will be done using a gap gage.

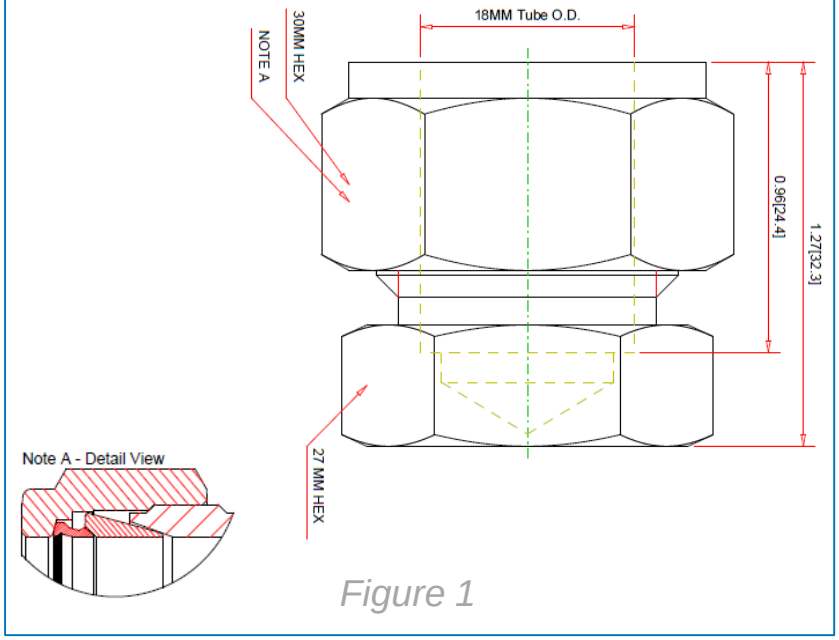


Figure 1

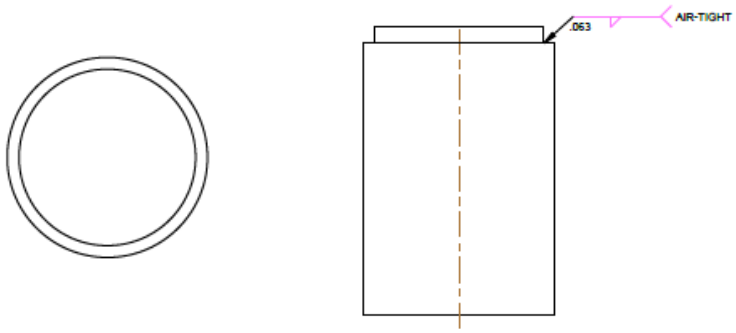


Figure 2

Figure 1 Swagelok Fitting Drawing
Figure 2 Welded Tube Drawing

Instrument

- Parr Instrument Company pressure vessel.
- 1L capacity.
- Maximum pressure and temperature are 350°C and 2000 psi, respectively.
- Three Swagelok vessels will be placed into the instrument, then it will be filled with colored water until all vessels are submerged.

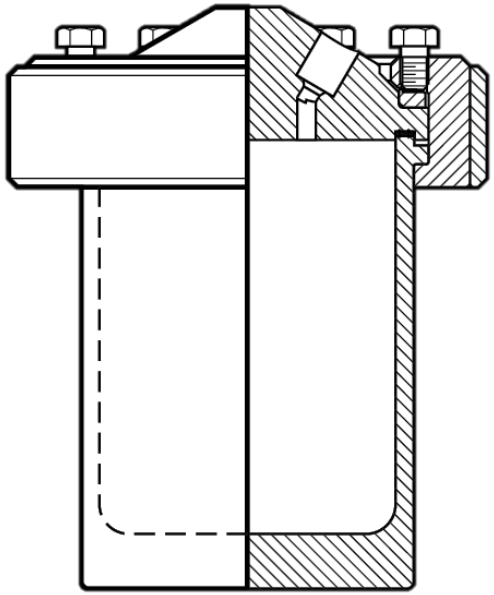


Figure 3

Figure 4

Figure 3 Internal Outline of Parr Pressure Vessel
Figure 4 Model 4600 Parr Instrument Pressure Vessel

Ideal Gas Law

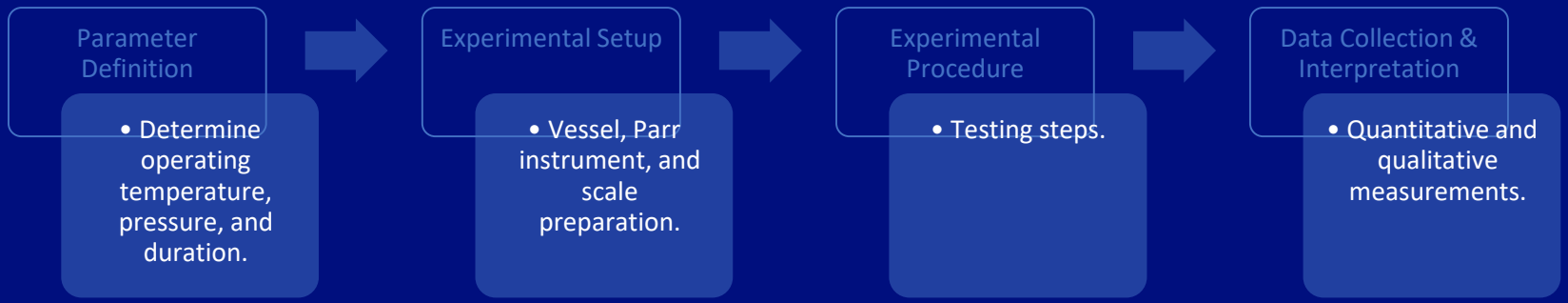
PV=nRT

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

- The Ideal Gas Law is a law that describes the relationships between measurable properties of an ideal gas.
- Assumptions made to simplify calculations.
- Determine internal pressure (P_2) in the vessel at 60°C and 80°C, using atmospheric pressure and room temperature as initial conditions.

Experimental Methods



Expected Results

- It is expected that by sealing the vessels to manufacturer specifications there should not be leaks.

Acknowledgements

- Philip Leonard Q-DO
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Questions?